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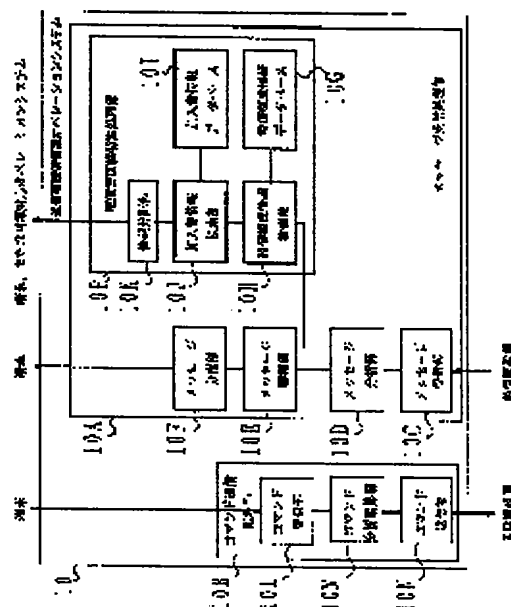
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(54) OPERATION SYSTEM FOR COMMUNICATION NETWORK

(57)Abstract:

PURPOSE: To improve the reliability and quality of a communication network by specifying a subscriber receiving a hindrance due to a fault system.

CONSTITUTION: When a communication network installation management operation system 10 receives a fault message, a message analysis section 10D checks a content included in the message. As a result, when specific processing for a failed line is executed, the message is given to an installation configuration information retrieval section 10H, the retrieval section 10H retrieves a database 10G by using a fault installation name included in the message as a retrieval key to locate the faulty installation. A subscriber information retrieval section 10J retrieves a subscriber information database 10I by using the faulty installation name accommodating the subscriber received from the retrieval section 10H as a retrieval key to locate a faulty subscriber, that is, a faulty line.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the operation system of a suitable communication network to perform efficiently not only the monitor of a communication network facility but the monitor of the **** circuit at the time of failure of a communication network facility between [, such as a telephone terminal and a data terminal,] subscriber terminals especially with respect to the operation system of the communication network which manages the telecommunication network which offers communication facility.

[0002]

[Description of the Prior Art] Conventionally, development of the operation system of the synthetic communication network which combined [page / 2051st] organically the advanced network monitor and control function with a network-control system, a traffic administration system, audit, a trial system, etc. like a publication for the purpose of upgrading of communication networks, such as a telephone network, from the 2050th page edited "an electronic intelligence communication link handbook" (1988, Ohm-Sha Issue) one by the Institute of Electronics, Information and Communication Engineers is furthered. In the operation system of such a communication network, there are communication network facility management operation system which performs maintenance by supervising a communication network facility of the exchange, multiplexer, etc., and management of a subscriber and the operation system corresponding to the circuit which manages the failure especially concerning a subscriber's communication link.

[0003] Drawing 7 is the block diagram showing an example of the configuration of the operation system of the conventional communication network. When failure occurs in the communication

network facilities (P and a publication among drawing) 2A-2F of the exchange in a communication network 1 etc., the communication network facility management operation system 3 detects the failure, takes a suitable measure quickly, and restores communication service. Moreover, the operation system 4 corresponding to a circuit performs repair arrangements to the section which maintains this locating fault, when the trial concerning a communication link with the communication network 1 of the subscriber terminals 5A-5B is performed based on that report by receiving the failure report and complaint about a communication link from the subscriber terminals (T and a publication among drawing) 5A-5B and failure is discovered.

[0004] When failure occurs in the communication network facilities 2A-2F, as for the communication network facility management operation system 3, the failure can be immediately discovered by the monitoring function. However, with the operation system 4 corresponding to a circuit, even when communication failure arises about the specific subscriber terminals 5A-5B by the failure, he does not notice the failure until it receives the failure report from the **** subscriber terminals 5A-5B, since there is also no function which supervises the communication network facilities 2A-2F and there is also no cooperation with the communication network facility management operation system 3. Therefore, after receiving a report, it is necessary to the communication network facility management operation system 3 to check the normality of the communication network facilities 2A-2F which hold the report subscriber terminals 5A-5B, and the quick and exact correspondence to the failure applicant terminals 5A-5B cannot be taken.

[0005] Moreover, the surveillance intelligence which the communication network facility management operation system 3 has is a failure device name, the contents of failure, etc., and cannot grasp whether even if that a certain failure has occurred in the communication network facilities 2A-2F in the operation system 4 side corresponding to a circuit can recognize such information only by notifying to the operation system 4 corresponding to a circuit as it is, which subscribers 5A-5B are ****(ing) it by the failure.

[0006] In order to advance communicative high reliance-ization, while attaining high reliance-ization of a communication network facility, it is required to specify immediately the facility and subscriber who **** by this failure, and to perform failure correspondence of the facility change by the side of a network etc. and system switching by the side of a subscriber at the time of failure of a facility. While supervising such a communication network facility, the operation system of the communication network which specifies the **** circuit at the time of failure of a communication network facility immediately is called for.

[0007]

[Problem(s) to be Solved by the Invention] The trouble which it is going to solve is a point that the subscriber terminal which the surveillance intelligence of communication network facility management operation system is not efficiently notified to the operation system corresponding to a circuit, but **** by failure of a communication network facility cannot be grasped quickly, in a Prior art. The purpose of this invention is offering the operation system of the communication network which makes it possible to raise the dependability and quality of a communication network by notifying the operation system corresponding to the circuit which manages a subscriber, or a subscriber of facility surveillance intelligence including this **** circuit information while it solves the technical problem of these conventional technique and specifies automatically the **** circuit at the time of failure of a communication network facility immediately.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the operation system of the communication network of this invention (1) Communication network facility management operation system which performs maintenance by supervising a communication network facility of the exchange, multiplexer, etc., In the operation system of the communication network which consists of operation system corresponding to the circuit which manages the failure concerning a subscriber's communication link etc., and performs synthetically a network control, traffic administration, audit, a trial, etc. of a communication network It is characterized by

specifying the subscriber who **** by failure of the communication network facility detected with communication network facility management operation system, and preparing the **** circuit specification processing section which notifies failure of a communication network facility to this operation system corresponding to a subscriber or a circuit that ****. In the operation system of a communication network given in (2) above (1) moreover, the **** circuit specification processing section The subscriber information database which accumulates the subscriber information containing a subscriber's terminal number, service attribute, and the hold exchange, The facility configuration information database which accumulates the configuration information of the communication network facility including the attribute information and connection relation information on a communication network facility of the exchange etc., A facility configuration information database is searched based on the notice information of failure from a communication network facility. The facility configuration information retrieval section which specifies the **** facility influenced by communication network facility of failure, A subscriber information database is searched based on the identification information of the **** facility specified in this facility configuration information retrieval section. It is characterized by providing the subscriber information retrieval section which specifies the **** subscriber who causes abnormalities to a communication link by failure of a communication network facility, and the information distribution section which notifies failure of a communication network facility to the operation system corresponding to the **** subscriber who specified in this subscriber information retrieval section, or a circuit. Moreover, in the operation system of (3) above (1) or a communication network given in either of (2), it is characterized by preparing the **** circuit specification processing section in communication network facility management operation system.

[0009]

[Function] In this invention, the operation system of a communication network can supervise the monitor of a communication network facility, and a subscriber's communication link synthetically, and can advance communicative high reliance-ization. That is, the **** circuit specification processing section specifies automatically the **** circuit at the time of failure of a communication network facility immediately based on the function manager of the communication network facility by communication network facility operation system. For example, the subscriber information database with which the **** circuit specification processing section accumulates subscriber information, such as a number of a terminal, and a service attribute, the hold exchange, When the facility configuration information database which accumulates the attribute information on a communication network facility of the exchange etc. and connection-related information is provided and the notice of failure from a communication network facility etc. detects failure While searching a facility configuration information database by using the device number of a failure facility as a key and specifying the facility influenced of a failure from the connection relation during a facility The subscriber who causes abnormalities to a communication link by facility **** is specified by searching a subscriber information database by using the device number of a **** facility as a key. And the operation system corresponding to the circuit which manages a subscriber, or a subscriber is notified of the facility surveillance intelligence by communication network facility operation system including this **** circuit information. By this, the operation system of a communication network can perform failure correspondence of a change of the communication network facility by the side of a network etc., and system switching by the side of a subscriber, and can cope with failure of a communication network facility efficiently.

[0010]

[Example] Hereafter, a drawing explains the example of this invention to a detail. Drawing 2 is the block diagram showing one example of the configuration concerning this invention of the operation system of the communication network of this invention. In this example the communication network facility management operation system 10 **** circuit specification processing section 10P concerning this invention are provided, and it is a communication network facility (among drawing) of the exchange in a communication network 1 etc. When failure occurs in P and Publications

2A-2F, while detecting the failure, taking a suitable measure quickly and restoring communication service the subscriber terminal (T and a publication among drawing) 11 which **** by failure of the communication network facilities 2A-2F by **** circuit specification processing section 10P -- specifying -- this subscriber terminal 11 that **** -- or each subscriber terminal (T and publication among drawing) 5A- it notifies to either of the operation system 4 corresponding to the circuit which manages the communication link condition of 5B and 11.

[0011] Thus, it sets to the operation system of the communication network of this example. Also when failure occurs in the communication network facilities 2A-2F and communication failure arises about some specific subscriber terminals 5A-5B by it, by **** circuit specification processing section 10P prepared in the communication network facility management operation system 10 Immediately, the failure can be discovered and failure correspondence of the facility change by the side of a network etc. and system switching by the side of a subscriber can be performed efficiently. Hereafter, detailed explanation of **** circuit specification processing section 10P is given using drawing 1.

[0012] Drawing 1 is the block diagram showing one example of the configuration concerning this invention of the communication network facility management operation system in drawing 2. The configuration of the communication network facility management operation system 10 of this example is roughly divided, and consists of command transmitting processing section 10B for controlling a communication network facility from the communication network facility 2 message reception section 10A [for receiving the message from the A - 2F side] and communication network facility management operation system 10 side in drawing 2.

[0013] Command transmitting processing section 10B analyzes the received command as command receive section 10L which receives the command from the subscriber terminals 5A-5B in drawing 2, and consists of command analysis editorial department 10M edited into the format transmitted to a communication network facility, and 10Ns of the command transmitting sections which perform processing which transmits the edited command to a corresponding communication network facility. Moreover, message receive section 10C to which message reception section 10A receives the message from a communication network facility, Message analyzer 10D which analyzes the message which received, and message are recording section 10E which accumulates the message which received in the storage in the communication network facility management operation system 10, It is constituted by message distribution section 10F which distribute a message to a predetermined terminal, and **** circuit specification processing section 10P which specify a **** circuit based on the message which received with respect to this invention.

[0014] Furthermore, subscriber information database 10I in which **** circuit specification processing section 10P accumulate subscriber information, such as a subscriber's terminal number, a service attribute, and the hold exchange, Facility configuration information database 10G which accumulate the attribute information and connection relation information on a communication network facility, The device number of the failure communication network facility shown by the message which received is used as a key. Facility configuration information retrieval section 10H which search facility configuration information database 10G, and specify the **** facility influenced of a failure from the connection relation between communication equipments, The device number of the **** facility specified by these facility configuration information retrieval section 10H is used as a key. Subscriber information retrieval section 10J which specify the subscriber terminal which searches subscriber information database 10I and causes abnormalities to a communication link by **** of a communication network facility, It is constituted by information distribution section 10K notified to the subscriber terminal specified by these subscriber information retrieval section 10J, and the operation system 4 corresponding to a circuit in drawing 2.

[0015] Subscriber information database 10I accumulates information, such as an identifier of the terminal which should be notified when a circuit **** per subscriber with the accomodated location information of the subscriber in the exchange which holds each terminal, or the exchange,

the line number (telephone number), a service attribute, and facility failure, or the operation system corresponding to a circuit, and facility configuration information database 10G accumulate the attribute information and the initial entry of a communication network facility of the exchange etc. Hereafter, specific processing actuation of the **** circuit by the communication network facility management operation system 10 of such a configuration is explained.

[0016] When failure occurs in a communication network facility, this communication network facility detects that failure, and notifies a failure message to the communication network facility management operation system 10. A failure facility name and the contents of failure are included in this message. If a message is received in message receive section 10C, in message analyzer 10D, the communication network facility management operation system 10 will check the failure device name and the contents of failure which are included in the message, and will judge whether it is the message which should perform **** circuit specification processing. The message which should perform specific processing of a **** circuit is beforehand registered into message analyzer 10D.

[0017] In being the message which performs specific processing of a **** circuit, it specifies the **** facility held in the subscriber whom hands over the information on that message to facility configuration information retrieval section 10H, and searches facility configuration information database 10G with these facility configuration information retrieval section 10H by using as a search key the failure facility name included in a message, and the subordinate of a corresponding failure facility has. Subscriber information database 10I is searched with subscriber information retrieval section 10J by using as a search key the **** facility name which holds the subscriber who succeeded from facility configuration information retrieval section 10H, and a **** subscriber, i.e., a **** circuit, is specified. Thus, the specified **** circuit information is distributed to a predetermined terminal or the operation system corresponding to a circuit by information distribution section 10K.

[0018] Hereafter, explanation of operation concerning this invention of the communication network facility management operation system 10 is given using drawing 3 - drawing 6. Drawing 3 is the block diagram showing one example of the connection configuration of the communication network facility in drawing 2. In this example, an analog and the subscriber terminals 5A-5B of ISDN are held for a subscriber system exchange plant. The circuit processing modules 20 and 21 which separate / multiplex a line switching call and a packet-switching call, and perform call processing about a line switching call, It has the packet processing module 22 which processes an ISDN packet call, and connection composition by the remote subscriber line multiplexing transmission equipment 23 which holds and multiplexes the remote subscriber terminals 5C-5D, and is sent to the circuit processing module 21. Moreover, the packet processing module 22 holds two or more circuit processing modules 20 and 21 of a configuration of being shown in following drawing 4.

[0019] Drawing 4 is the block diagram showing one example of the configuration of the circuit processing module in drawing 3. The subscriber circuits 21H-21K where the circuit processing module 21 of this example carries out termination of the subscriber loop, Multiplex subscriber line terminal equipment 21L which performs connection control with the remote subscriber line multiplexing transmission equipment 23 possessing subscriber circuits 23B-23C and multiplexer 23A, The line concentration and the allotment sections 21F-21G which concentrate these subscriber circuits 21H-21K and multiplex subscriber line terminal equipment 21L, and are assigned to a specific channel, Call control information and the main information (real communication link information) Separation, separation [which carries out multiplex] / multiplexing sections 21D-21E, It is constituted by speech path section 21A which performs switching processing of a circuit, central processing unit 21B which controls the whole circuit processing module 21 and performs call processing, and signal-processing section 21C which performs signal processing of call control information.

[0020] The example of a configuration of subscriber information database 10I of the

communication network facility management operation system 10 in drawing 1 at the time of being aimed at such drawing 3 and a communication network facility of a configuration of being shown in drawing 4 is shown in following drawing 5 .

[0021] Drawing 5 is the explanatory view showing one example of the configuration concerning this invention of the subscriber information database of the communication network facility management operation system in drawing 1 . As a data item of the subscriber information database of this example The circuit processing module number 101 which holds a subscriber terminal, and the line equipment number 102 assigned [each circuit processing module number correspondence] to each subscriber at a meaning, A subscriber's line number 103 and the service which the subscriber uses For example, an analog call service (A and a publication among drawing) and ISDN service (among drawing) There is an identifier 105 of the terminal it should be notified at the time of a failure that is the use service 104 which shows I, a publication, ISDN circuit exchange service (the inside of drawing, CS, and publication), an ISDN packet switching service (the inside of drawing, PS, and publication), etc., or the operation system corresponding to a circuit etc.

[0022] About the subscriber directly held in each circuit processing module, a line equipment number 102 It is given in the combination of line concentration and the allotment section number 106, and the subscriber circuit number 107, and about the subscriber of the remote subscriber line multiplexing transmission equipment 23 hold in drawing 3 and drawing 4 It is given in the combination of line concentration, the allotment section number 106 and the remote subscriber line multiplexing transmission equipment number (the inside of drawing, RT number, and publication) 108, and the subscriber circuit number (the inside of drawing, the subscriber circuit number in RT, and publication) 109. Searching the subscriber information database of such a configuration, subscriber information retrieval section 10J in drawing 1 specify a **** circuit.

[0023] Drawing 6 is the explanatory view showing one example of the configuration concerning this invention of the facility configuration information database of the communication network facility management operation system in drawing 1 . The facility configuration information database of this example For example, the packet processing module number 110 which shows the number of each packet processing modules used as an administration object, such as the packet processing module 22 in drawing 3 , For example, the data item of the hold circuit processing module number 111 which shows the number of the circuit processing module held in the packet processing modules 22, such as the circuit processing modules 20-21 in drawing 3 , Furthermore, the circuit IF number 112 in a packet processing module which shows the circuit contained by each packet processing module, There is a data item of the connection circuit information 114 which shows the connection receipt condition of circuits, such as the circuit IF number 113 in a circuit processing module which shows the circuit contained by each circuit processing module.

[0024] Searching such drawing 5, and the subscriber information database and facility configuration information database of a configuration of being shown in 6, subscriber information retrieval section 10J in drawing 1 specify a **** circuit. Hereafter, the actuation concerning this invention of this example is explained based on the system configuration of drawing 1 , referring to drawing 3 and drawing 4 .

[0025] In drawing 3 , when failure occurs during operation, each communication network facility of the circuit processing module 21, the packet processing module 22, and the remote subscriber line multiplexing transmission equipment 23 detects the failure autonomously, and notifies it to the communication network facility management operation system 10 in drawing 1 by making failure information into a message, respectively. If the failure message from a communication network facility is received, in message analyzer 10D, the communication network facility management operation system 10 of drawing 1 will analyze the message, and will judge whether it is the message made into the object of **** circuit specification processing. If it is an object message, according to the failure device name and the contents of failure, **** circuit specification processing which was roughly divided as follows in the case of three will be performed.

[0026] (1) In failure of subscriber units, such as subscriber line failure, the protocol error in the

user / network interface of medium failure of a subscriber line or ISDN etc. serves as failure communication link addition of a subscriber unit, cutting and a poor communication link. The circuit processing module 21 in drawing 3 will notify as a failure message that this subscriber's accommodated location numbers are the detected contents of failure to the communication network facility management operation system 10 of drawing 1 , if such failure is detected.

[0027] In the communication network facility management operation system 10 shown in drawing 1 , if this failure message is received, it is message analyzer 10D, and that message will be checked and it will judge that it is the message which performs **** circuit specification processing. And subscriber information retrieval section 10J of drawing 1 succeed the information on a message from message analyzer 10D of drawing 1 , by using as a search key the messaging former circuit processing module number contained in a message as a parameter, and a line equipment number, search subscriber information database 10I of drawing 1 which consists of an item shown in drawing 6 , and specify the line number corresponding to the accommodated location number which is ****(ing), i.e., the **** line number. And information distribution section 10K of drawing 1 distribute the **** line number and a failure situation according to the identifier of the terminal which is included in subscriber information and which should be notified, or the operation system corresponding to a circuit.

[0028] (2) When failure of the common equipment in the circuit processing module 21 in drawing 4 occurs in the common equipment failure in the circuit processing module 21 of drawing 4 , communication failure occurs to two or more specific subscribers held in this common equipment. The case where the line concentration shown in drawing 4 and allotment section 21F break down as an example is explained. The circuit processing module 21 in drawing 4 will notify as a failure message that the broken common equipment name (line concentration and allotment section) and its number are the detected contents of failure to the communication network facility management operation system 10 of drawing 1 , if line concentration and failure of allotment section 21F are detected.

[0029] In the communication network facility management operation system 10 shown in drawing 1 , when this failure message is received, it is message analyzer 10D, and it judges that it is the message which performs **** circuit specification processing, and the information on a message is handed over to subscriber information retrieval section 10J. And the messaging former circuit processing module number contained in a message as a parameter, and a failure common equipment name (line concentration and allotment section) and its number are used as a search key, and subscriber information database 10I of drawing 1 is searched with subscriber information retrieval section 10J of drawing 1 . When the line concentration in a line equipment number and an allotment section number pull out all the subscribers that are in agreement with the failure device number, the **** line number is specified. And the information information distribution section 11 of drawing 1 distributes the **** line number and a failure situation according to the identifier of the terminal which is included in subscriber information and which should be notified, or the operation system corresponding to a circuit.

[0030] (3) In the packet processing module 22 which is shown in drawing 3 in the case of a packet processing module system down, when a system down, a system restart process, etc. occur, communication failure, such as communication link improper or communication link cutting, occurs about the ISDN packet subscriber held in this packet processing module 22. In the communication network facility management operation system 10 shown in drawing 1 , from the packet processing module 22 of drawing 3 , when this failure message is received, it judges that it is message analyzer 10D and is the message which performs **** circuit specification processing, and hands over that the information on a message and packet service use are improper to facility configuration information retrieval section 10H.

[0031] The circuit processing modules 20-21 in influenced drawing 3 are specified by searching facility configuration information database 10G of drawing 1 with these facility configuration information retrieval section 10H shown in drawing 1 by using as a search key the messaging

former packet processing module number contained in a message as a parameter, and acquiring the number of all the circuit processing modules held in this packet processing module. Furthermore, subscriber information retrieval section 10J of drawing 1 succeed that a **** circuit processing module number and packet service use are improper from facility configuration information retrieval section 10H of drawing 1, search subscriber information database 10I of drawing 1 which consists of an item shown by drawing 5 by making for a **** circuit processing module number and a subscriber's use service to be ISDN packets into retrieval conditions, and specify the **** circuit about ISDN packet service. And the information distribution section 11 of drawing 1 distributes the **** line number, a failure situation, and the purport for which packet service use is improper according to the identifier of the terminal which is included in subscriber information and which should be notified, or the operation system corresponding to a circuit.

[0032] As mentioned above, as explained using drawing 1 - drawing 6, in the operation system of the communication network of this example, the facility influenced of failure and a **** subscriber can be automatically specified at the time of failure of a communication network facility, and a communication-network-management person and a subscriber can be notified immediately at it. By this, a communication-network-management person can take failure correspondence of network configuration changes, such as a detour, a circuit hold substitute, priority recovery of an important subscriber, etc., etc. Moreover, a subscriber can suppress interruption of business by change in a backup circuit etc. to the minimum.

[0033] In addition, this invention is not limited to the example explained using drawing 1 - drawing 6, and can be variously changed in the range which does not deviate from the summary. For example, although the **** circuit specification processing section was considered as the configuration prepared in communication network facility management operation system in this example, the configuration prepared according to an individual is sufficient as communication network facility management operation system.

[0034]

[Effect of the Invention] According to this invention, not only the monitor of a communication network facility but the monitor of the **** circuit by failure of a communication network facility can be performed efficiently, and it is possible to raise the engine performance of the operation system of a communication network.

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CLAIMS

[Claim(s)]

[Claim 1] The communication network facility management operation system which performs maintenance by supervising a communication network facility of the exchange, multiplexer, etc., In the operation system of the communication network which consists of operation system corresponding to the circuit which manages the failure concerning a subscriber's communication

link etc., and performs synthetically a network control, traffic administration, audit, a trial, etc. of a communication network. The subscriber who **** by failure of the communication network facility detected with the above-mentioned communication network facility management operation system is specified. Operation system of the communication network characterized by establishing a **** circuit specification means to notify failure of the above-mentioned communication network facility to the this subscriber who ****, or the above-mentioned operation system corresponding to a circuit.

[Claim 2] In the operation system of a communication network according to claim 1 the above-mentioned **** circuit specification means The subscriber information database which accumulates the subscriber information containing the above-mentioned subscriber's terminal number, service attribute, and the hold exchange, The facility configuration information database which accumulates the configuration information of the communication network facility including the attribute information and connection relation information on a communication network facility of the exchange etc., Based on the notice information of failure from the above-mentioned communication network facility, the above-mentioned facility configuration information database is searched. A facility configuration information retrieval means to specify the **** facility influenced by the above-mentioned communication network facility of failure, The above-mentioned subscriber information database is searched based on the identification information of the **** facility specified with this facility configuration information retrieval means. A subscriber information retrieval means to specify the **** subscriber who causes abnormalities to a communication link by failure of the above-mentioned communication network facility, Operation system of the communication network characterized by providing an information distribution means to notify failure of the above-mentioned communication network facility to the **** subscriber who specified with this subscriber information retrieval means, or the above-mentioned operation system corresponding to a circuit.

[Claim 3] Operation system of the communication network characterized by establishing the above-mentioned **** circuit specification means in the above-mentioned communication network facility management operation system in the operation system of a communication network given in either claim 1 or claim 2.

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